



Inserts new line at the position of the cursor in editor.



Scrolls screen to next page of editor.



Scrolls screen to previous page of editor.



Shift

\*Prints the screen onto the printer. Will only print graphics if a graphics printer is attached.

\*Indicates a key function that works both inside and outside the editor.

## Special Words

- EDITOR** Input for EDITFILE, standing for contents of the edit buffer.
- END** Tells Logo that you finished defining a procedure.
- ERRACT** System variable; if TRUE, Logo pauses when error occurs.
- ERROR** Tag for THROW when error occurs.
- FALSE** Special input for AND, IF, NOT, OR, SETCAPS, and TEST.
- PROCPKG** Property of procedure name; value is its package.
- REDEFP** System variable; if TRUE, primitives can be redefined.
- STARTUP** System variable; if a list, Logo runs it immediately after the file containing this variable is loaded.
- .SYSTEM** Package containing ERRACT and REDEFP (initially buried).
- TOPLEVEL** Tag for THROW to return control to top level.
- TRUE** Special input for AND, IF, NOT, OR, SETCAPS, and TEST.

- TURTLE** Input for SETSHAPE, standing for normal turtle shape. Can also be output of SHAPE.
- VALPKG** Property of variable name; value is its package.

## Color

SETBG *colornumber* (graphics mode)

\*SETTC *colorlist* (text mode)

### Number with Corresponding color

0 Black	6 Brown	11 Light Cyan
1 Blue	7 White	12 Light Red
2 Green	8 Gray	13 Light Magenta
3 Cyan	9 Light Blue	14 Yellow
4 Red	10 Light Green	15 High-intensity White
5 Magenta		

\*Foreground color 0-15  
Background color 0-7 or 8-15 blinking

IBM Monochrome Display

Foreground: 0 Black  
1 Underlined White  
2-7 White  
8-15 High-intensity White (except with background 0, 7, 8, or 15)

Background: 0-6 Black  
7 White (with foreground 0 or 8)  
8-15 Blinking

SETPC *colornumber* 0-3

SETPAL *n* 0 or 1

Pencolor	Palette	
	0	1
1	Green	Cyan
2	Red	Magenta
3	Brown	White
0	Same as background	

# Logo

by Logo Computer Systems, Inc.

Education Family

**IBM**  
Personal  
Computer  
Software

6360591



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## Turtle Graphics

BACK (BK) <i>n</i>	Moves turtle <i>n</i> steps back.
BACKGROUND (BG)	Outputs number representing background color for graphics screen.
CLEAN	Erases graphics screen without affecting turtle.
CLEARSCREEN (CS)	Erases screen, moves turtle to [0 0], sets heading to 0.
DOT <i>pos</i>	Puts a dot of the current pen color at the coordinates specified by <i>pos</i> .
FENCE	Fences turtle within edges of screen.
FILL	Fills in a closed shape with the current pen color.
FORWARD (FD) <i>n</i>	Moves turtle <i>n</i> steps forward.
HEADING	Outputs turtle's heading (its direction) in degrees.
HIDETURTLE (HT)	Makes turtle invisible.
HOME	Moves turtle to [0 0] and sets heading to 0.
LEFT (LT) <i>n</i>	Turns turtle <i>n</i> degrees left (counterclockwise).
LOADPIC <i>filespec</i>	Loads screen image in <i>filespec</i> directly onto screen.
PALETTE (PAL)	Outputs number for the palette of colors.

**Note:** Short forms for primitives, when they exist, are in parentheses. Inputs, in italics, also are enclosed in parentheses when optional. A number sign (#) indicates a procedure which can take any number of inputs. If you give it other than the number indicated, you must enclose the entire expression in parentheses.

PEN	Outputs pen state: list containing mode (PD, PU, PE, PX), color, and palette.
PENCOLOR (PC)	Outputs number representing pen color.
PENDOWN (PD)	Puts pen down.
PENERASE (PE)	Puts eraser down.
PENREVERSE (PX)	Puts reversing pen down.
PENUP (PU)	Raises pen.
POS	Outputs position of turtle in coordinates.
RIGHT (RT) <i>n</i>	Turns turtle <i>n</i> degrees right (clockwise).
SAVEPIC <i>filespec</i>	Saves screen image in <i>filespec</i> .
.SCRUNCH	Outputs current aspect ratio of screen.
SETBG <i>n</i>	Sets background in graphics to color number <i>n</i> .
SETHEADING (SETH) <i>n</i>	Sets turtle's heading (direction) to <i>n</i> degrees.
SETPAL <i>n</i>	Sets the palette of colors to <i>n</i> .
SETPC <i>n</i>	Sets pen color to <i>n</i> .
SETPEN <i>penlist</i>	Sets pen to list of mode, color, and palette.
SETPOS <i>pos</i>	Moves turtle to coordinates specified by <i>pos</i> .
.SETSCRUNCH <i>n</i>	Sets aspect ratio of screen to <i>n</i> .
SETSHAPE <i>n</i>	Changes the turtle's shape to a pattern specified by ASCII code <i>n</i> .
SETX <i>x</i>	Moves turtle horizontally to position with <i>x</i> -coordinate.
SETY <i>y</i>	Moves turtle vertically to position with <i>y</i> -coordinate.

SHAPE	Outputs the turtle's current shape.
SHOWNP	Outputs TRUE if turtle is visible.
SHOWTURTLE (ST)	Makes turtle visible.
SNAP <i>n</i>	Copies image under turtle onto the turtle's shape and stores it in ASCII code <i>n</i> .
STAMP	Stamps copy of turtle's shape onto the screen.
TOWARDS <i>pos</i>	Outputs heading turtle would have if facing the coordinates specified by <i>pos</i> .
WINDOW	Removes boundaries from turtle field.
WRAP	Makes turtle field wrap around edges of screen.
XCOR	Outputs x-coordinate of turtle's position.
YCOR	Outputs y-coordinate of turtle's position.

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## Words and Lists

ASCII <i>char</i>	Outputs ASCII code for the <i>char</i> (character).
BUTFIRST (BF) <i>obj</i>	Outputs all but first element of its input.
BUTLAST (BL) <i>obj</i>	Outputs all but last element of its input.
CHAR <i>n</i>	Outputs character whose ASCII code is <i>n</i> .



RECYCLE	Performs a garbage collection.
REPARSE	Reparses procedures.
SAVE <i>device/filespec</i> ( <i>package(list)</i> )	Writes whole workspace or <i>package(list)</i> onto <i>device/filespec</i> .
UNBURY <i>package</i>	Unburies procedures and names in <i>package</i> .

### Property Lists

GPROP <i>name prop</i>	Outputs value of <i>prop</i> property of <i>name</i> .
PLIST <i>name</i>	Outputs property list of <i>name</i> .
PPROP <i>name prop obj</i>	Gives property <i>prop</i> with value <i>obj</i> to <i>name</i> .
PPS ( <i>package(list)</i> )	Prints property list(s) of everything (in <i>package(list)</i> ).
REMPROP <i>name prop</i>	Removes property <i>prop</i> from property list of <i>name</i> .













### Assembly Language

.BLOAD <i>filespec (base offset)</i>	Loads an assembly language file into memory at <i>base</i> and <i>offset</i> .
.BSAVE <i>filespec base</i> <i>offset length</i>	Saves memory region, starting from <i>base</i> and <i>offset</i> for <i>length</i> in bytes, into <i>filespec</i> .
.CALL <i>base offset</i>	Calls the machine language subroutine at address <i>base</i> and <i>offset</i> .
.DEPOSIT <i>base offset byte</i>	Stores value <i>byte</i> at address <i>base</i> and <i>offset</i> .
.EXAMINE <i>base offset</i>	Outputs the value of the byte stored at the address <i>base</i> and <i>offset</i> .

### Primitives (Infix Form)

$a + b$	Outputs <i>a</i> plus <i>b</i> .
$a - b$	Outputs <i>a</i> minus <i>b</i> .
$a * b$	Outputs <i>a</i> times <i>b</i> .
$a / b$	Outputs <i>a</i> divided by <i>b</i> .
$a < b$	Outputs TRUE if <i>a</i> is less than <i>b</i> .
$obj1 = obj2$	Outputs TRUE if <i>obj1</i> is equal to <i>obj2</i> .
$a > b$	Outputs TRUE if <i>a</i> is greater than <i>b</i> .

### Special Keys

 Backslash  Backspace	*Quotes next character you type.  *Erases character to left of cursor.
 Cursor Left	*Moves cursor one space to the left.
 Cursor Right	*Moves cursor one space to the right.
  Shift	*  Moves cursor to beginning of current line.
  Shift	*  Moves cursor to end of current line.
 Cursor Up	Moves cursor up to previous line in editor.
 Cursor Down	Moves cursor down to next line in editor.

\*Indicates a key function that works both inside and outside the editor.



Enter



\*Carriage return.

Erases everything on current line to  
right of cursor.



\*Inserts last line deleted.

Ctrl-Break

1. Outside editor, interrupts and  
stops a running procedure.
2. Inside editor, aborts editing.



Interrupts whatever is running.  
Typing any key resumes running.



Moves cursor to end of the edit  
buffer.



Moves cursor to top of the edit  
buffer.



\*Deletes character at cursor position.



Moves cursor to end of current page  
in editor.



Leaves editor, reading buffer as if it  
was typed in.



Outside editor, corresponds to  
TEXTSCREEN.



Outside editor, corresponds to  
MIXEDSCREEN.



Inserts a copy of the last line typed.



Outside editor, corresponds to  
FULLSCREEN.



Outside editor, corresponds to  
PAUSE.



Moves cursor to top of current page  
in editor.

\*Indicates a key function that works both inside and outside the editor.



COUNT <i>obj</i>	Outputs the number of elements in its input.
EMPTY <i>obj</i>	Outputs TRUE if <i>obj</i> is empty list or empty word.
EQUAL <i>obj1 obj2</i>	Outputs TRUE if its inputs are equal.
FIRST <i>obj</i>	Outputs first element of its input.
FPUT <i>obj list</i>	Outputs list formed by putting its first input at beginning of <i>list</i> .
ITEM <i>n obj</i>	Outputs <i>n</i> th element of its input.
LAST <i>obj</i>	Outputs last element of its input.
LIST <i>obj1 obj2</i>	# Outputs list of its inputs, preserving their list structure.
LISTP <i>obj</i>	Outputs TRUE if <i>obj</i> is a list.
LPUT <i>obj list</i>	Outputs list formed by putting its first input at end of <i>list</i> .
MEMBERP <i>obj1 obj2</i>	Outputs TRUE if its first input is an element of its second input.
NUMBERP <i>obj</i>	Outputs TRUE if <i>obj</i> is a number.
SENTENCE, SE <i>obj1 obj2</i>	# Outputs list of its inputs.
WORD <i>word1 word2</i>	# Outputs word made up of its inputs.
WORDP <i>obj</i>	Outputs TRUE if <i>obj</i> is a word.

## Variables

EDNS ( <i>package(list)</i> )	Stands for EDit NameS. Starts Logo editor (containing variables in <i>package(list)</i> ).
LOCAL <i>name</i>	# Makes <i>name</i> local.
MAKE <i>name obj</i>	Gives the value <i>obj</i> to the variable <i>name</i> .
NAME <i>obj name</i>	Makes <i>obj</i> the value of <i>name</i> .
NAMEP <i>name</i>	Outputs TRUE if <i>name</i> has a value.
THING <i>name</i>	Outputs the value of <i>name</i> .

## Arithmetic Operations

ARCTAN <i>y (x)</i>	Outputs arctangent of <i>y</i> or <i>x/y</i> in degrees.
COS <i>a</i>	Outputs cosine of <i>a</i> degrees.
DIFFERENCE <i>a b</i>	Outputs <i>b</i> subtracted from <i>a</i> .
EFORM <i>n a</i>	Outputs <i>n</i> in scientific notation, using <i>a</i> digits.
EXP <i>a</i>	Outputs <i>e</i> to the power of <i>a</i> .
FORM <i>n a (b)</i>	Outputs number <i>n</i> with <i>a</i> digits before the decimal point and <i>b</i> digits after it.
INT <i>n</i>	Outputs integer portion of <i>n</i> .
LN <i>a</i>	Outputs log of <i>a</i> to the base <i>e</i> .
PI	Outputs mathematical constant $\pi$ .
POWER <i>n a</i>	Outputs <i>n</i> to the power of <i>a</i> .
PRECISION	Outputs the number of significant digits a number is rounded to when used by Logo.

PRODUCT <i>a b</i>	#Outputs product of its inputs.
QUOTIENT <i>a b</i>	Outputs <i>a</i> divided by <i>b</i> .
RANDOM <i>n</i>	Outputs random non-negative integer less than <i>n</i> .
REMAINDER <i>a b</i>	Outputs remainder of <i>a</i> divided by <i>b</i> .
RERANDOM	Makes RANDOM act reproducibly.
ROUND <i>n</i>	Outputs <i>n</i> rounded off to nearest integer.
SETPRECISION <i>n</i>	Sets current precision of numbers to <i>n</i> .
SIN <i>a</i>	Outputs sine of <i>a</i> degrees.
SQRT <i>n</i>	Outputs square root of <i>n</i> .
SUM <i>a b</i>	#Outputs sum of its inputs.

## Defining and Modifying Procedures

COPYDEF <i>newname name</i>	Copies definition of <i>name</i> onto <i>newname</i> .
DEFINE <i>name list</i>	Makes <i>list</i> the definition of <i>name</i> .
DEFINEDP <i>word</i>	Outputs TRUE if <i>word</i> is the name of a procedure.
EDIT (ED) ( <i>name(list)</i> )	Starts Logo editor (containing named procedures).
PRIMITIVEP <i>name</i>	Outputs TRUE if <i>name</i> is a primitive.
TEXT <i>name</i>	Outputs definition of procedure <i>name</i> as a list.
TO <i>name (inputs)</i>	Begins defining procedure <i>name</i> .



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## Flow of Control

CATCH <i>name list</i>	Runs <i>list</i> ; returns when THROW <i>name</i> is run.
CO ( <i>obj</i> )	Resumes a procedure after a pause. Outputs <i>obj</i> to PAUSE.
ERROR	Outputs list of information about most recent error.
GO <i>word</i>	Transfers control to LABEL <i>word</i> .
IF <i>pred list1 (list2)</i>	If <i>pred</i> is TRUE, runs <i>list1</i> ; otherwise, <i>list2</i> .
IFFALSE (IFF) <i>list</i>	Runs <i>list</i> if most recent TEST was FALSE.
IFTRUE (IFT) <i>list</i>	Runs <i>list</i> if most recent TEST was TRUE.
LABEL <i>word</i>	Creates a labeled line for use by GO.
OUTPUT (OP) <i>obj</i>	Returns control to calling procedure with <i>obj</i> as output.
PAUSE	Suspends running of the procedure.
REPEAT <i>n list</i>	Runs <i>list</i> <i>n</i> times.
RUN <i>list</i>	Runs <i>list</i> ; outputs what <i>list</i> outputs.
STOP	Stops procedure and returns control to caller.
TEST <i>pred</i>	Determines whether <i>pred</i> is TRUE or FALSE.
THROW <i>name</i>	Transfers control to corresponding CATCH.

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## Logical Operations

AND <i>pred1 pred2</i>	#Outputs TRUE if all of its inputs are TRUE.
NOT <i>pred</i>	Outputs TRUE if <i>pred</i> is FALSE.
OR <i>pred1 pred2</i>	#Outputs TRUE if any of its inputs are TRUE.

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## Communicating with the Outside World

ALLOPEN	Outputs a list of devices/files which are currently open.
BUTTONP <i>n</i>	Outputs TRUE if button on paddle or joystick <i>n</i> is down.
CLOSE <i>device/filespec</i>	Closes a currently opened <i>device/filespec</i> .
CLOSEALL	Closes all currently opened files and devices.
DIR (( <i>drive:</i> ) <i>filespec</i> )	Displays names of files on disk.
DISK	Outputs the current disk drive.
.DOS	Releases control to the Disk Operating System.
DRIBBLE <i>device/filespec</i>	Starts process of sending a copy of text on the screen to <i>device/filespec</i> .
EDITFILE <i>infilespec (outfilepec)</i>	Starts Logo editor with the contents of <i>infilespec</i> . Saves <i>infilespec</i> under <i>outfilepec</i> .
ERASEFILE <i>filespec</i>	Erases file <i>filespec</i> from diskette.
FILELEN <i>filespec</i>	Outputs the length in bytes of <i>filespec</i> .

FILEP <i>filespec</i>	Outputs TRUE if <i>filespec</i> exists.
KEYP	Outputs TRUE if a key has been typed but not yet read.
NODRIBBLE	Turns off dribble process and closes the dribble file.
OPEN <i>device/filespec</i>	Opens <i>device/filespec</i> .
PADDLE <i>n</i>	Outputs rotation of dial on paddle <i>n</i> or position of stick on joystick <i>n</i> .
POFILE <i>filespec</i>	Prints out the contents of <i>filespec</i> .
PRINT (PR) <i>obj</i>	#Prints its input followed by carriage return and linefeed, but doesn't print the outer brackets of lists.
READCHAR (RC)	Outputs character read by the current file or device (default is keyboard). Waits, if necessary.
READCHARS (RCS) <i>n</i>	Outputs <i>n</i> characters read by the current file or device (default is keyboard). Waits, if necessary.
READEOF	Outputs TRUE if the position of the <i>filespec</i> being read is the end of the file.
READER	Outputs the name of current <i>device/filespec</i> opened for reading.
READLIST (RL)	Outputs line read by current file or device (default is keyboard). Waits, if necessary.
READPOS	Outputs reader position of current file being read.
READWORD (RW)	Outputs first word read by current file or device (default is keyboard). Waits, if necessary.



<b>.SETCOM</b> <i>n bdrp parity databits stopbits</i>	Sets the serial communications line.
<b>SETDISK</b> <i>drive:</i>	Sets disk to <i>drive:</i> .
<b>SETREAD</b> <i>device/filespec</i>	Sets the <i>device/filespec</i> from which the output of RC, RCS, RL, and RW will be read.
<b>SETREADPOS</b> <i>n</i>	Sets the file position for reading the current <i>filespec</i> .
<b>SETWRITE</b> <i>device/filespec</i>	Sets the destination of inputs to PRINT, TYPE, SHOW, PO, and POFILE.
<b>SETWRITEPOS</b> <i>n</i>	Sets the file position for writing into the current <i>filespec</i> .
<b>SHOW</b> <i>obj</i>	Prints its input followed by carriage return and line feed – with brackets for lists.
<b>TONE</b> <i>freq dur</i>	Produces a sound of frequency <i>freq</i> for duration <i>dur</i> .
<b>TYPE</b> <i>obj</i>	#Prints its input, but not the outer brackets of lists.
<b>WAIT</b> <i>n</i>	Causes a pause of about <i>n</i> 18ths of a second.
<b>WRITEOFF</b>	Outputs TRUE if the write pointer is at the end of the <i>filespec</i> being written.
<b>WRITEPOS</b>	Outputs position of write pointer in file currently being written to.
<b>WRITER</b>	Outputs name of current <i>device/filespec</i> open for writing.

## Text and Screen

<b>CAPS</b>	Outputs TRUE if Caps Lock key is disabled and false if active.
<b>CLEARTEXT</b> (CT)	Clears text portion of screen.
<b>CURSOR</b>	Outputs position of cursor on screen.
<b>FULLSCREEN</b> (FS)	Devotes entire screen to graphics. Same as F4 key.
<b>MIXEDSCREEN</b> (MS)	Allows both text and graphics on the screen. Same as F2 key.
<b>.SCREEN</b>	Outputs 1 or 2, depending on whether you are working with one or two screens.
<b>SETCAPS</b> <i>pred</i>	TRUE disables Caps Lock key; FALSE enables it.
<b>SETCURSOR</b> <i>pos</i>	Puts cursor at the screen position specified by <i>pos</i> .
<b>.SETSCREEN</b> <i>n</i>	Sets number of screens to 1 or 2.
<b>SETTC</b> <i>colorlist</i>	Sets text colors to <i>colorlist</i> (foreground, background).
<b>SETTEXT</b> <i>n</i>	Sets text portion of graphics screen to <i>n</i> lines from bottom.
<b>SETWIDTH</b> <i>n (a)</i>	Sets width of screen to <i>n</i> columns. Second input moves text <i>a</i> columns to right or left.
<b>TEXTCOLOR</b> (TC)	Outputs a list of the numbers for current text colors.
<b>TEXTSCREEN</b> (TS)	Devotes entire screen to text. Same as F1 key.
<b>WIDTH</b>	Outputs current width of screen.

## Workspace Management

<b>BURY</b> <i>package</i>	Buries procedures and variable names contained in <i>package</i> .
<b>.CONTENTS</b>	Outputs list of all names, procedure names, and other words in workspace.
<b>ERALL</b> ( <i>package(list)</i> )	Erases everything (in <i>package(list)</i> ).
<b>ERASE</b> (ER) <i>name(list)</i>	Erases named procedure(s).
<b>ERN</b> <i>name(list)</i>	Erases named variable(s).
<b>ERNS</b> ( <i>package(list)</i> )	Erases variables (contained in <i>package(list)</i> ).
<b>ERPS</b> ( <i>package(list)</i> )	Erases procedures (contained in <i>package(list)</i> ).
<b>LOAD</b> <i>filespec (package)</i>	Loads file <i>filespec</i> into workspace (into <i>package</i> ).
<b>NODES</b>	Outputs number of free nodes.
<b>PACKAGE</b> <i>package name(list)</i>	Puts named procedure(s) in <i>package</i> .
<b>PKGALL</b> <i>package</i>	Puts in <i>package</i> everything not already packaged.
<b>PO</b> <i>name(list)</i>	Prints definitions of named procedure(s).
<b>POALL</b> ( <i>package(list)</i> )	Prints definitions of procedures (in <i>package(list)</i> ).
<b>PONS</b> ( <i>package(list)</i> )	Prints names and values of variables (in <i>package(list)</i> ).
<b>POPS</b> ( <i>package(list)</i> )	Prints definitions of procedures (in <i>package(list)</i> ).
<b>POTS</b> ( <i>package(list)</i> )	Prints title lines of procedures (in <i>package(list)</i> ).